2.2 Angle Bisectors

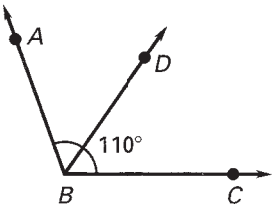
Goal Bisect an angle.

VOCABULARY

Angle bisector

Example 1 ***Find Angle Measures***

$\overrightarrow{BD}$ bisects $\angle ABC$, and $m\angle ABC = 110°$. Find $m\angle ABD$ and $m\angle DBC$.



Solution

$\overrightarrow{BD}$ bisects $\angle ABC$, so $m\angle ABD$ is half of $m\angle ABC$.

$m\angle ABD = \frac{\quad}{\quad} \cdot m\angle ABC$

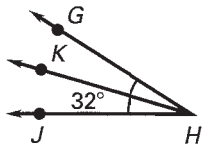
$= \frac{\quad}{\quad} \cdot \_\_\_\_$

$= \_\_\_\_$

Answer $m\angle DBC = m\angle ABD = \_\_\_\_$

✔ ***Checkpoint*** $\overrightarrow{HK}$ **bisects** $\angle GHJ$. **Find** $m\angle GHK$ **and** $m\angle KHJ$.

1.



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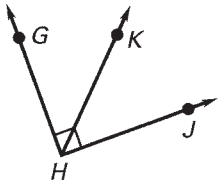

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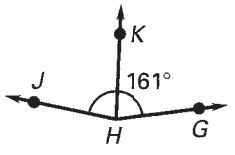
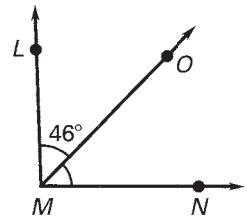


Example 2 ***Angle Measures and Classification***

$\overrightarrow{MO}$ bisects $\angle LMN$, and $m\angle LMO = 46°$.



a. Find $m\angle OMN$ and $m\angle LMN$.

b. Determine whether $\angle LMN$ is *acute*, *right*, *obtuse*, or *straight*. Explain.

Solution

a. $\overrightarrow{MO}$ bisects $\angle LMN$, so $m\angle LMO = m\angle OMN$.

$m\angle OMN = m\angle LMO =$ ____

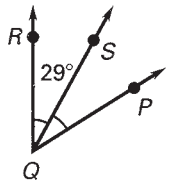
The measure of $\angle LMN$ is twice the measure of $\angle LMO$.

$m\angle LMN =$ ___ $\cdot\ m\angle LMO =$ ___ $\cdot$ ____ $=$ ____

b. $\angle LMN$ is _____ because its measure is between 90° and 180°.

Checkpoint $\overrightarrow{QS}$ **bisects** $\angle PQR$. **Find** $m\angle SQP$ **and** $m\angle PQR$. **Then tell whether** $\angle PQR$ **is** ***acute***, ***right***, ***obtuse***, **or** ***straight***.

4.



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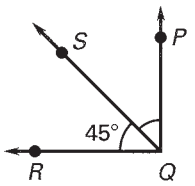

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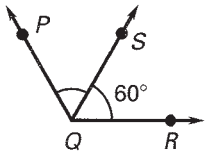
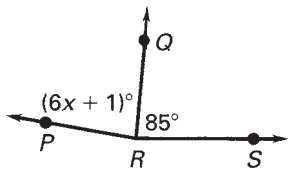


Example 3 ***Use Algebra with Angle Measures***

$\overrightarrow{RQ}$ bisects $\angle PRS$. Find the value of x.



Solution

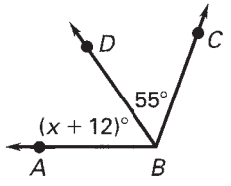
$m\angle PRQ = m\angle QRS$	$\overrightarrow{RQ}$ **bisects** $\angle PRS$.
$(\_\_\_\_\_)° = \_\_\_\_$	**Substitute the given angle measures.**
$\_\_\_\_\_ = \_\_\_\_\_$	**Subtract __ from each side.**
$\_\_\_ = \_\_\_$	**Simplify.**
$\frac{\_\_\_}{\_\_\_} = \frac{\_\_\_}{\_\_\_}$	**Divide each side by __.**
$x = \_\_\_$	**Simplify.**

Follow-Up **Check your answer for Example 3.**

Substitute your value of x in the original equation to determine whether it is a solution.

Checkpoint $\overrightarrow{BD}$ **bisects** $\angle ABC$. **Find the value of** x.

7.



8.